

# Current state of knowledge on exploited cephalopods in the Italian waters

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## Abstract

Data collections on catch and effort and estimates of the economic parameters related to the Italian fishery are produced by the Institute for Economic Research on Fisheries and Aquaculture (IREPA). Recently, IREPA carried out a throughout revision of the existing data collection system, in order to improve fisheries statistics reliability and to better satisfy the requirements of the European Commission. This allowed to get detailed information previously not available and more adequately reliable data on fisheries resources, including cephalopods. Based on these recent databases, cephalopod landings during the years 1999-2002 are described and analyzed according to main fishing gear and different group/species. The decreasing trend shown by cephalopod landings of the last decades in the Mediterranean Sea and in the Italian fishery (FAO data), is evident: the Italian cephalopod production reached its lower value in 2002. Possible reasons for this decreasing trend are commented. A national research project carried out 20 years ago to investigate fisheries statistics on a local scale also is commented to promote and stimulate discussion. Lastly, perspectives for cephalopod fisheries are considered and the continuous increase of the Italian cephalopod imports, both in values and quantity, briefly commented.

## Riassunto

I dati relativi alle catture, allo sforzo ed alle stime dei parametri economici riguardanti la pesca italiana sono oggi forniti dall'Istituto per la Ricerca Economica sulla Pesca e l'Acquacoltura (IREPA). Recentemente l'IREPA ha effettuato un accurato processo di revisione del sistema di raccolta dei dati, nell'ottica di migliorare l'attendibilità delle statistiche della pesca e rispondere in maniera più soddisfacente alle esigenze dell'Unione Europea. Ciò ha consentito di ottenere informazioni dettagliate in passato non disponibili e dati più attendibili sulle varie risorse oggetto di pesca, inclusi i cefalopodi. Questa banca dati è stata utilizzata nel presente lavoro per analizzare e descrivere le catture di cefalopodi verificatesi nel quadriennio 1999-2002, per sistema di pesca e per raggruppamenti e/o specie. L'analisi ha confermato l'andamento decrescente già evidenziato, per la pesca italiana, nelle ultime decadi (dati FAO), con il minimo 'storico' raggiunto nel 2002. Tale andamento viene brevemente commentato. Per stimolare e promuovere ulteriori approfondimenti sull'argomento, si commentano anche i risultati di un progetto specifico sul rilevamento delle statistiche della pesca condotto in Italia 20 anni fa. Vengono infine riportate alcune considerazioni sulle prospettive della pesca dei cefalopodi nel nostro Paese, anche alla luce del continuo aumento delle importazioni di questa risorsa.

## Key words

Cephalopoda, fishery, Italian waters, recent trends, current knowledge.

## Introduction

The availability of reliable information on fishery statistics in Mediterranean countries is hampered by several factors: the existence of a very large number of landing places scattered along the coastlines; the presence of highly diversified and large fishing fleets; the fact that most fisheries operate without a system of catch quota management; the fact that only a fraction of the fishery products is sold through formally organized markets, and that most of the fisheries are multi-specific. In this peculiar situation, conventional tools used to compute fisheries statistics elsewhere, like logbooks, landing declarations and sales records, do not work adequately. Recently, a general consensus developed on the opportunity to use sampling surveys carried out on the base of statistical designs and *ad hoc* elaborated methodological procedures to get the needed information; this would then be expanded to produce the overall estimates by using robust statistical procedures.

This is not a new concept in the Italian context; more than 20 years ago the quality check programme PESTAT (Bazigos et al., 1984; Cingolani et al., 1986), based on sampling surveys, was designed and carried out by the Istituto di Ricerche sulla Pesca Marittima (IRPEM) of the Consiglio Nazionale delle Ricerche (CNR), with the technical assistance of FAO. Results were very interesting, but the data collection system was considered too expensive to become a routinely applied method on a national scale.

In recent years too many national and international agencies with different specific competences operated in Italy to gather statistical information, e.g. the Istituto Nazionale di Statistica (ISTAT), the Istituto di Ricerche Economiche per la Pesca e l'Acquacoltura (IREPA), the Ministero delle Politiche Agricole e Forestali (MIPAF), the European Union and FAO. An operational decision was eventually taken by the Italian administration and IREPA was identified to start a process of throughout revision of the existing data collection system, in cooperation

with ISTAT. This resulted in the elaboration of detailed and specific procedures aimed to improve the quality of the information collected and increase the number of parameters to monitor. Results were considered successful and since 2002 IREPA is the official reference Institution for the production of the Italian fishery statistics. Aim of this work is to describe the present Italian cephalopod fishery, based on the IREPA new database (1999-2002) analysis (IREPA, 2002); the cooperation existing between ICRAM and IREPA allowed to acquire data and information not published on the IREPA official Yearbooks due to the specificity of the details considered.

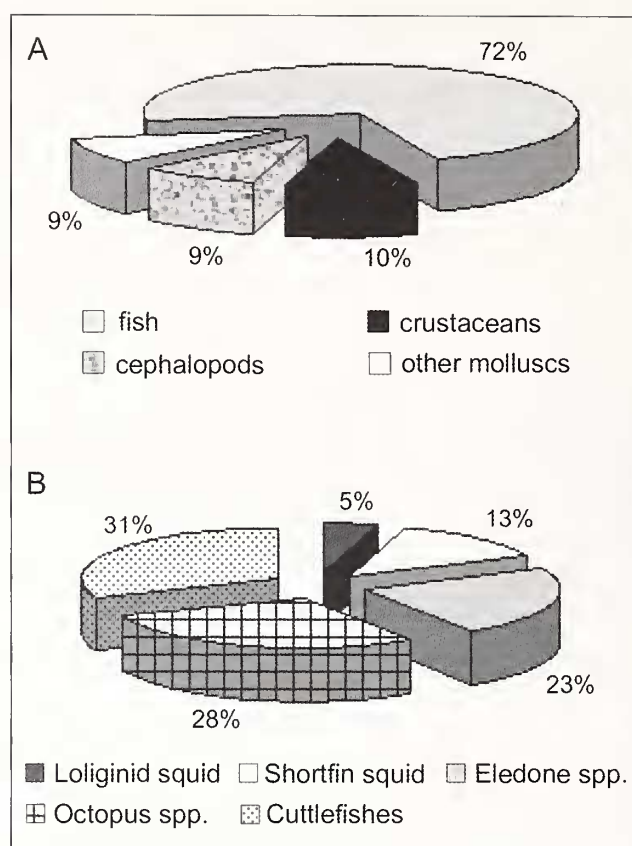
## Material and methods

Along with the PESTAT conceptual approach, though the statistics applied by the two procedures may slightly differ (for all the statistical details and specifics see Bazigos et al., 1984; Cingolani et al., 1986; IREPA, 2002), the

LIGURIA	Genova Imperia Savona
TUSCANY	Livorno Portoferraio Viareggio
LATIUM	Civitavecchia Gaeta Roma
CAMPANIA	Napoli Salerno
CALABRIA	Vibo Valentia
SARDINIA	Cagliari Porto Torres
SICILY	Catania Marsala Mazara del Vallo Milazzo Sciacca Trapani Palermo Siracusa
APULIA	Bari Manfredonia Molfetta
ABRUZZI	Pescara
MARCHE	Ancona Pesaro San Benedetto del Tronto
EMILIA ROMAGNA	Ravenna Rimini
VENETO	Chioggia Viareggio

**Tab. 1.** Landing places selected by IREPA system of statistical data collection (IREPA, 2001).

**Tab. 1.** Punti di sbarco selezionati dal sistema IREPA per la raccolta dati statistici (IREPA, 2001).



**Fig. 1.** Cephalopod landings in 2002 (IREPA database): **A.** Percentages of cephalopods and the other main commercial fisheries categories over the total fishery landings; **B.** Percentages of the main cephalopods commercial groups over the total cephalopod landings.

**Fig. 1.** Cefalopodi sbarcati nel 2002 (banca dati IREPA): **A.** Percentuali di cefalopodi e delle altre principali categorie di pescato commerciale sul totale del pescato sbarcato; **B.** Percentuali dei principali gruppi commerciali di cefalopodi sul totale dei cefalopodi sbarcati.

IREPA methodology consists in a single stage stratified sampling by two stratification variables: maritime regions (i.e. a geographical stratification) and fishing systems (i.e. a technical stratification); these include trawlers, purse-seiners, mid-water pair trawlers, dredgers, small scale fisheries, multi-purpose vessels and tuna fisheries, according to the official denomination of the Italian fishing fleet/gears (AA.VV., 2003).

Main goals of the investigation are the evaluation of fishing effort and activity, the evaluation of landings and prices by group of species and the evaluation of economics.

Data collection is carried out by means of three questionnaires: an annual questionnaire to record technical, dimensional and vessel-management information on the sample units and relevant socio-economic aspects; a quarterly questionnaire to record data on fixed and variable costs, and on social aspects of property and crew; a weekly questionnaire to record information reporting activity such as fishing time and area, average number of crew members, gears used, quantities, prices and revenues – as per species or group of species – and trade channel for sales. The selected landing places are reported in **Tab. 1**.

Data collectors are chosen among operators from the productive or management fishery sectors; this repre-

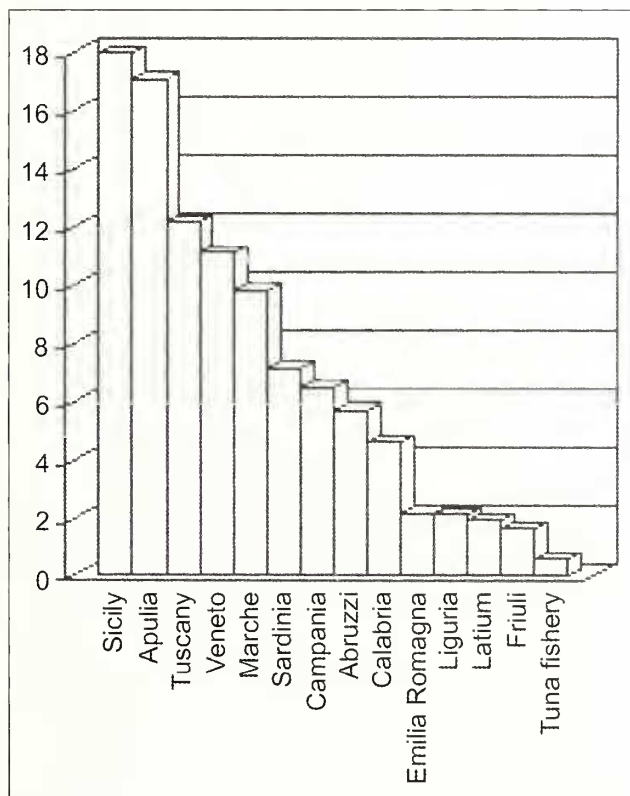
sent a brand new approach, aimed to obtain more reliable and timely data. Periodic inspections are carried out in order to check their work, and data are sent directly to the IREPA server via internet.

## Results

With a total of slightly over 26,600 tonnes, cephalopods represented 9% of total Italian landings in 2002 (Fig. 1 A), the main fraction of which was constituted by octopods (51%), followed by cuttlefishes (31%) and squids (18%) (Fig. 1 B).

Trawlers account for the major component of cephalopod catches, over 50% of the overall catch in 2002; small scale fisheries still constitute the second most important group of cephalopod catching methods, but the percentage of the landings over the total is lower than in the past and the same is true also for the multi-purpose fisheries. The Italian region contributing to the total Italian cephalopod landings with the highest percentage is Sicily (fishing area: Strait of Sicily), followed by Apulia (fishing area: southern Adriatic and Ionian Sea), 18 and 16% respectively, and then by the group formed by Tuscany (fishing area: Tyrrhenian Sea), Veneto and Marche (fishing area: northern and middle Adriatic Sea) (Fig. 2).

The Italian region for which cephalopods represent a relatively higher component of the regional landings, however, are Tuscany, Sardinia and Campania, followed by Veneto and Abruzzi (Fig. 3). The general decreasing



**Fig. 2.** Cephalopod landings by Region (% over the total Italian cephalopod landings) in 2002 (IREPA database). Those vessels authorized to fish tuna represent an additional specific stratum.

**Fig. 2.** Cefalopodi sbarcati per regione (% sul totale dei cefalopodi italiani sbarcati) nel 2002 (banca dati IREPA). Le imbarcazioni autorizzate alla pesca del tonno rappresentano un strato specifico aggiuntivo.

	1999	2000	2001	2002
Longfin squid	2.212	2.101	1.662	1.218
Shortfin squid	4.257	3.022	3.158	3.565
Squids	6.469	5.124	4.819	4.783
<i>Eledone</i> spp.	1.792	1.210	1.135	6.126
<i>Octopus</i> spp.	14.958	15.042	14.726	7.453
Octopods	16.751	16.252	15.861	13.578
Cuttlefishes	14.525	14.915	13.211	8.281
TOTAL	37.745	36.291	33.892	26.642

**Tab. 2.** Italian cephalopod production (tonnes) by main group and year (IREPA database).

**Tab. 2.** Produzione italiana di cefalopodi (tonnellate) per categoria e anno (banca dati IREPA).

trend of the landings observed from 1999 till 2002 (i.e. from over 37,700 in 1999 to slightly over 26,600 tonnes landed in 2002) affected longfin squid, cuttlefish and octopods landings (Tab. 2); as for the octopods group, the sudden increase in the *Eledone* spp. landings, opposite to the abrupt decrease in *Octopus* spp. landings, is an artefact due to the improvement in the accuracy of the species identification by the operators, therefore only the trend of the group as a whole should be considered when using this set of data. As for the main fishing systems used to catch cephalopods, a major decrease in landings is shown in the small scale fisheries, followed by the multi-purpose fisheries, while trawl catches decreased only slightly (Fig. 4).

## Discussion

The overall Italian fishery production in the Mediterranean Sea had been decreasing constantly over the last

		Pestat	Irepa
Sicily	Cephalopods	7	8
	Other molluscs	1	1
	Crustaceans	7	20
	Fish	85	71
Northern Adriatic Sea	Cephalopods	10	7
	Other molluscs	22	2
	Crustaceans	5	10
	Fish	63	81
Southern Adriatic Sea	Cephalopods	12	7
	Other molluscs	29	27
	Crustaceans	1	6
	Fish	58	60

**Tab. 3.** Comparison between PESTAT (1982) and IREPA (2002) analyses of cephalopod landings (%) in relation to the other main fishery resources by main fishery productive geographical areas.

**Tab. 3.** Confronto fra le analisi PESTAT (1982) e IREPA (2002) dei cefalopodi sbarcati, in percentuale rispetto alle altre categorie di pescato per le principali aree geografiche di produzione.

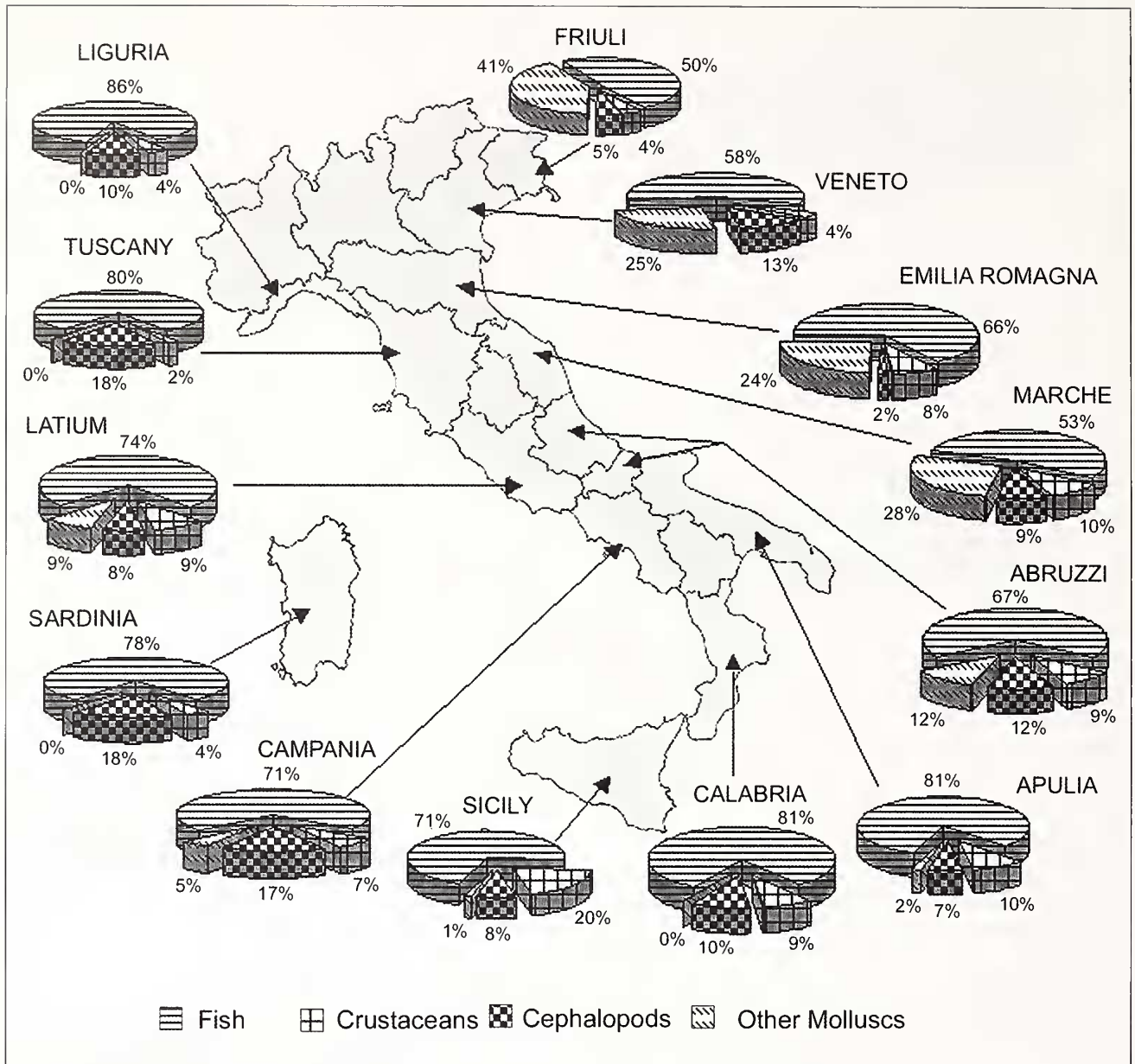


Fig. 3. Cephalopod landings percentage in relation to the other main fishery categories, by Region, in 2002 (IREPA database).

Fig. 3. Percentuale dei cefalopodi sbarcati in relazione alle altre principali categorie di pescato per regione nel 2002 (banca dati IREPA).

decade: with catch levels around 300,000 tonnes in 2002, the Italian fishery industry registered its worst outcome. This reduction in landings is shown also by cephalopod landings, and this represents an unusual situation in the general frame of the cephalopod fishery worldwide. The reduction of the Italian fishing effort (in terms of both reduction of the fishing fleet and activity) occurred since the end of the '90s (IREPA, 2002), may partially explain at least a fraction of the observed decrement, e.g. the decrease which affected the artisanal fishery. However, the more general trend shown by the analysis of historical series of data of cephalopod landings (Fig. 5) (FAO, 2004a), indicates that the decrease started far before the beginning of the reduction of the Italian fishing effort. The fact that a decrement in landings is shown by all the three commercially exploited groups also is peculiar: it may indicate that factors other than the reduction of fishing effort are affecting the landings amount (e.g. a true decrease in the cephalopod exploited populations).

It is not possible to use PESTAT and IREPA datasets to perform statistical cross analysis and/or comparisons; however, it is possible to jointly view the situation described for the year 1982 by the PESTAT sampling survey and that described for the year 2002 by the IREPA investigation, to promote and stimulate further discussion and targeted studies. This comparison (Fig. 6) shows that while the fraction of cephalopod landings in 2002 would represent more or less the same percentage, in relation to other fishery resources, as the fraction landed in 1982, the situation changes when looking at the main Italian fishery production sectors (Tab. 3): here a decrease in cephalopod landings is detectable in the Adriatic area. Interestingly, this is what is reported by the FAO year-book statistics referring to the Mediterranean Sea (FAO, 2004a), where numbers point out a decrease in cephalopod landings in the Adriatic and Ionian Sea, while non significant trends are detectable for the western and eastern Mediterranean basins.

## Conclusions

Cephalopod value as fishery resource increased worldwide in the last decade and Europe is presently the main world cephalopod market (FAO, 2004b). Spain and Italy were the second and third country in the world respectively as for cephalopod import quantity in 2001 and Italy was at the third place, after Japan and Spain, as for the imported value (over 420 million US dollars [FAO, 2004b]). This peaked to slightly less than 530 million in 2002, which represented about 18% of the total Italian fishery imported value in the same year. This undoubtedly confirms the importance of the cephalopods resource for the Italian economy and market.

This considered, the above reported observations, though only descriptive, clearly support the opportunity to promote target studies on the Italian cephalopods fishery to better understand the present situation and its possible developments.

The improvement of the quality of the available information in terms of additional detailed elaboration of data collected (national IREPA database), possible at a local level depending on local policies, could help in gathering ever more complete descriptions on cephalopod fishery at the necessary detailed scale.

Studies focused on the market structure and prices trends and pressures could help understanding whether and how foreign product affects national production, as for frozen products.

Study focused on the small scale fishery could help in better quantifying the importance of cephalopod for small, local entities and help in supporting future decisions and strategies, as for fresh products and high valued species. Additional information from national research projects (e.g. national trawl surveys) analysed by means of different methodologies, including new approaches (e.g. Jereb

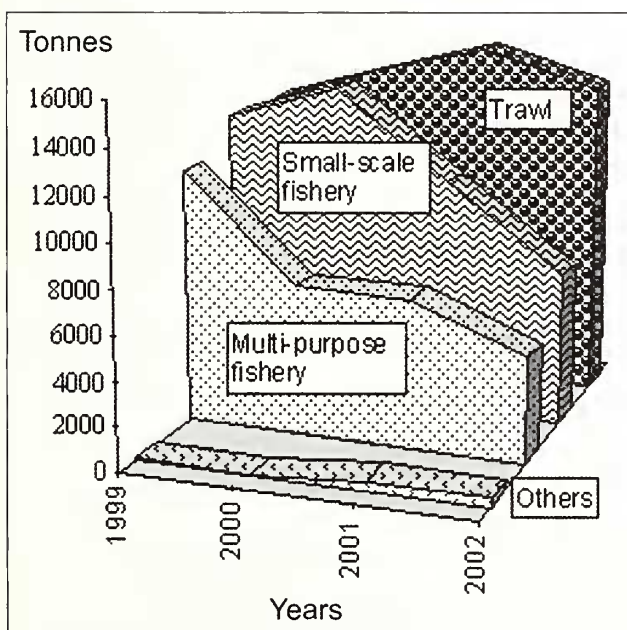


Fig. 4. Cephalopod landings by main fishing system in the years 1999-2002 (IREPA database).

Fig. 4. Cefalopodi sbarcati per metodo di pesca negli anni 1999-2002 (banca dati IREPA).

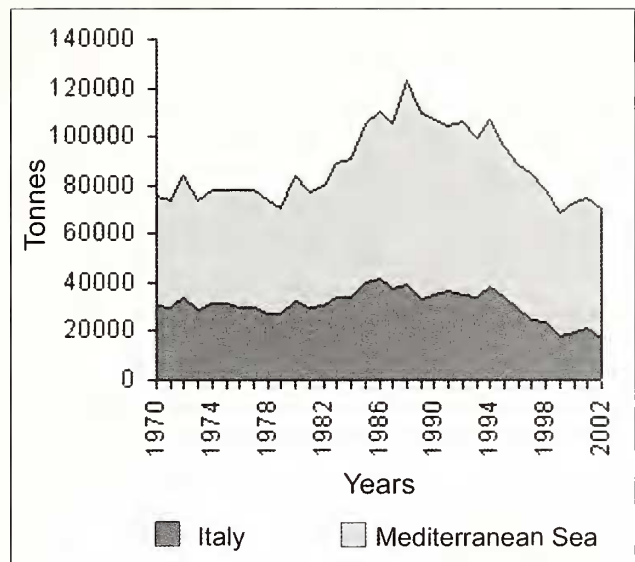


Fig. 5. Cephalopod landings in the Mediterranean Sea in the years 1970-2002 (FAO database) (FAO, 2004a).

Fig. 5. Cefalopodi sbarcati nel Mediterraneo negli anni 1970-2002 (banca dati FAO) (FAO, 2004a).

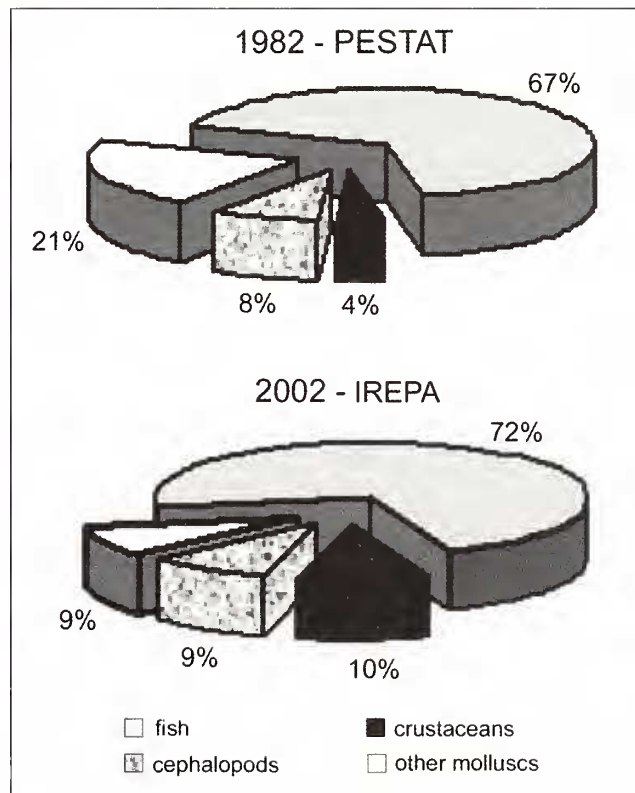


Fig. 6. Comparison between PESTAT (1982) and IREPA (2002) analyses of cephalopod landings (%) in relation to the other main fishery resources.

Fig. 6. Confronto fra le analisi PESTAT (1982) e IREPA (2002) dei cefalopodi sbarcati, in relazione % con le altre categorie di pescato.

et al., 2005), and combined with environmental information could help understanding the situation of the resource at sea.

## Acknowledgements

We heartily thank Maria Cozzolino (IREPA Institute) and IREPA for their total support and efficient coopera-

tion, without which the present study would not have been possible. Also, our deep thanks go to the colleague and friend Nando Cingolani for his critical reading of the draft manuscript. Last but not least, our thanks to Rafael La Perna for his help in the illustrations editing. Finally, we acknowledge that this work was performed within the E.U. Research Project CEPHSTOCK (*Cephalopod Stocks in European Waters: Review, Analysis, Assessment and Sustainable Management*), Concerted Action 2002-05.

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